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Financial Liberalization, Financing Constraints and Political Connection: Evidence from Chinese Firms

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Abstract

This paper examines the impact of recent financial liberalization in China on the financing constraints of publicly-listed Chinese firms with and without politically-connected CEO/Chairman. Two continuous indices are used to measure the evolution and intensity of financial reforms: a financial liberalization index and a capital control index. The results indicate that while firms without politically-connected CEO/Chairman face significant financing constraints and politically-connected firms do not, financial liberalization has reduced the constraints for the former. Similarly, lower capital control in China's equity market lessens credit constraints for non-connected firms. No statistically-significant impact is detected with regards to firms that have CEO/Chairman with powerful political background.

JEL classification: E22, G31, G18, O16

Keywords: Financial liberalization, investments, financing constraints, political connection, Chinese firms

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1. INTRODUCTION AND BACKGROUND

Most emerging markets initiated reforms in their domestic financial system and opening up capital accounts in the 1990s. Financial integration with the global economy is supposed to enhance economic growth by promoting supply of savings, improving efficiency of allocation of funds, and facilitating risk sharing. However, financial crises taking place in many of these emerging markets in the 1990s and 2000s have raised questions on the assumed benefits of the liberalization. Moreover, empirical studies have produced inconclusive evidence on the impact of financial liberalization on economic growth. These studies primarily use country-level data. Kose et al. (2006) suggest that using micro data is more suitable in discovering specific channels of the relationship and is therefore more useful to policy lessons.

This paper, using Chinese firm-level data, is a study of a specific mechanism on which financial liberalization can affect growth. We examine the impact of recent financial reforms and political connection in China on the financing constraints of publicly-listed firms. China, despite its tremendous growth for the last three decades and rising importance in the global economy, has only recently begun reforming its financial system and integrating its financial markets into the regional and global structures. There has been no systematic research on the impact of such financial reforms on the performance of enterprises in China.

Modigliani and Miller (1958) suggest that when there is no financial friction, firms' capital structure is inconsequential to their value. Under the assumption of perfect capital markets, internal and external funds are perfect substitutes and firms' investment is made independently of their financing choice. In practice, informational asymmetries and agency cost give rise to financial frictions and, therefore, firms face higher cost of external financing. Firms are then considered financially constrained when their investment decisions depend on the available internal funds.

Developing and transitional economies engage in financial reforms to improve the efficiency of their capital markets. Such reform measures as interest rate liberalization and reduction in entry barriers to the banking sector promote domestic savings; promotion of prudential regulations and scaling down of direct credit can lead to more efficient capital allocation. Further, opening up the domestic financial markets to foreign investors and liberalizing the capital accounts can attract more productive money that contributes to the overall pool of funds available for domestic investment.¹

Schiantarelli (1996) contains a detailed review of earlier studies on the effect of financial liberalization on the credit constraints of firms in emerging markets. Some of the more recent studies are summarized in Table 1. A common feature of these studies is that they focus on a subset of firms that would likely be subjected to external financing constraints and examine how the financial reforms have affected these firms. The grouping criteria include size, age, business group and bank affiliation, dividend-payout behaviour. For example, Jaramillo et al. (1996) find

¹ However, it has been suggested that such external liberalization measures, as part of the financial globalization process, can make some countries more prone to crisis due to over-borrowing and moral hazard (McKinnon and Pill, 1997) and volatile short-term capital flows (Kose et al., 2006).

that small and young firms in Ecuador were financially constrained while large and old firms were not; and the financial reforms introduced in Ecuador in the 1980s did not help relaxing the constraints for small and young firms. Koo and Maeng (2005) show that financial liberalization in South Korea reduces credit constraints for small and non-chaebol firms but not for large and chaebol firms.

Political connection of the CEO and Chairman of the board of directors of the firm has not been used as a sample-splitting criterion. This institutional feature is particularly important in China. Chinese firms, large or small, private or state-owned, finance their investment primarily from bank credits. And banks' lending behavior very often is a legacy of that of state banks and mentality from the planned economy in the past, which were based on personal and political connections. Moreover, despite increasing importance of the private sector in the economy, many large and important firms in China remain tightly under the government control; their business serves not only national economic policies but also political objectives.

There have been studies that look at the how the political connection of important management personnel gives rise to different corporate behavior or performance outcome. Faccio et al. (2006) show that politically-connected firms in 35 countries, China not included, are more likely to be bailed out when they face financial difficulties than similar non-connected firms. Johnston and Mitton (2003) look at how capital controls in Malaysia in September 1998, a one-time policy measure instituted in response to the Asian financial crisis, affect stock market valuation of Malaysian firms with and without political ties to the Prime Minister. Fan et al. (2007) examine how listed firms in China with and without politically-connected CEOs perform after IPO in terms of stock returns, earnings growth, sales growth, and returns on sales.

Our paper examines the impact of financial reforms, including opening up stock market to foreign investors, in China on listed firms' investment constraints, taking into account the political background of the firm's CEO/Chairman. There has been no study on this particular topic.

We discuss the empirical methods and data in Section 2. Section 3 contains results. Concluding remarks follow in Section 4.

2. EMPIRICAL METHODS AND DATA

We adopt an investment model based on the Euler-equation approach widely used in the literature, including Forbes (2007), Harrison et al (2004), Love (2003), and Laeven (2003).² The model yields the following empirical equation:

$$\left(\frac{I}{K}\right)_{it} = \alpha_0 + \alpha_1 \left(\frac{I}{K}\right)_{i,t-1} + \alpha_2 \left(\frac{Sales}{K}\right)_{it} + \alpha_3 \left(\frac{Cash}{K}\right)_{it} + f_i + \varepsilon_{it}, \quad (1)$$

² A detailed description of the investment model is provided in Appendix.

where I_t is investment over period t , K_t is capital stock at the beginning of period t , Sales are total sale revenue of period t , Cash is cash holdings at the beginning of period t , f_i is firm-specific effect, and ε_{it} is white-noise error term. Under the null of no financing constraints, $\alpha_3 \leq 0$. If firms face financing constraints, then $\alpha_3 > 0$. That is, when the firms' investment responds positively to an increase in internal funds, they are considered credit-constrained. Equation (1) can be modified to take into account the possibility that political background of the firm's CEO/Chairman influences its access to external credits and therefore financing constraints:

$$\begin{aligned} \left(\frac{I}{K}\right)_{it} = & \alpha_0 + \alpha_1 \left(\frac{I}{K}\right)_{i,t-1} + \alpha_2 \left(\frac{Sales}{K}\right)_{it} + \alpha_3 \left(\frac{Cash}{K} \times Pol\right)_{it} \\ & + \alpha_4 \left(\frac{Cash}{K} \times NonPol\right)_{it} + f_i + \varepsilon_{it}, \end{aligned} \quad (2)$$

where Pol and $NonPol$ are dummy variables indicating, respectively, the firm has a CEO/Chairman with and without powerful political background.

To examine the impact of financial liberalization on firms' financing constraint, we incorporate a financial liberalization index (FLI) and a capital control index (CCI) into the Equation (2):

$$\begin{aligned} \left(\frac{I}{K}\right)_{it} = & \alpha_0 + \alpha_1 \left(\frac{I}{K}\right)_{i,t-1} + \alpha_2 \left(\frac{Sales}{K}\right)_{it} + \alpha_3 \left(\frac{Cash}{K} \times Pol\right)_{it} + \alpha_4 \left(\frac{Cash}{K} \times NonPol\right)_{it} \\ & + \alpha_5 \left(\frac{Cash}{K} \times FLI \times Pol\right)_{it} + \alpha_6 \left(\frac{Cash}{K} \times FLI \times NonPol\right)_{it} + f_i + \varepsilon_{it} \end{aligned} \quad (3)$$

$$\begin{aligned} \left(\frac{I}{K}\right)_{it} = & \alpha_0 + \alpha_1 \left(\frac{I}{K}\right)_{i,t-1} + \alpha_2 \left(\frac{Sales}{K}\right)_{it} + \alpha_3 \left(\frac{Cash}{K} \times Pol\right)_{it} + \alpha_4 \left(\frac{Cash}{K} \times NonPol\right)_{it} \\ & + \alpha_5 \left(\frac{Cash}{K} \times CCI \times Pol\right)_{it} + \alpha_6 \left(\frac{Cash}{K} \times CCI \times NonPol\right)_{it} + f_i + \varepsilon_{it} \end{aligned} \quad (4)$$

These equations can be augmented with additional variables to control for other firm-level effects.

There are some estimation issues with Equations (1-4): firm-specific effects, possible endogeneity of the regressors, and presence of the lagged dependent variable. To deal with these issues, we use GMM-difference dynamic panel estimator developed by Arellano and Bond (1991). This estimation method first-differences each variable to eliminate the firm-specific effects and then uses the lagged levels of the variables as their instruments.

We obtain financial data for Chinese firms listed on the Shanghai and Shenzhen stock markets from the Worldscope database. Financial and services firms are excluded. Extreme outliers for the key variables in Equation (1) are excluded. We use the financial data from the Worldscope database to maintain consistency in terms of data construction, variable definition,

and quality with recent studies on other emerging markets. Table 2 contains definition of the variables used in the regression analysis.

As for the indicator of firm's political connection, we identify the CEO and Chairman of the board of directors of each firm in the China Stock Market and Accounting Research (CSMAR) database and examine their biography. When no CEO/Chairman is identified for a given firm in CSMAR, we then try to locate the information via Sina Finance website.³ If biographical information or the name of the CEO/Chairman is missing from these sources, the firm is excluded from our sample. A firm is considered politically-connected if its CEO/Chairman is or was a government official or a military officer or someone with a political ranking at the provincial or ministerial level. Since the CEO/Chairman appointment is around 3 years, we combine the information on the political background based on the year 2007 with firms' financial data for 2005-2007 in Worldscope.⁴ Our unbalanced sample contains 3585 firm-year observations and up to 1347 firms.

Table 3 provides some summary statistics for investment, sales, and cash, all scaled by capital stock. In each cell, the first number is the value averaged over 2005-2007 whereas the number in the parentheses is the standard deviation. While firms without political ties generate greater sales per unit of capital they also hold more cash relative to politically connected firms. Unconnected firms may hold cash in anticipation of higher investment in the future or as a precaution against liquidity constraints. This possibility is examined in the sensitivity analysis.

To investigate the effects of financial reforms on firms' credit constraints, we use the financial liberalization index and capital control index constructed in Chan, Dang, and Yan (2010)⁵. The FLI tracks reform measures in five categories: interest rate liberalization, reduction of entry barriers into the banking sector, decreases in directed credit, promotion of prudential regulations, and privatization of state banks. These categories are consistent with those considered in Laeven (2003) and Yi and Ding (2007). A principal component analysis is applied to these categories. The first component accounts for more than 80 percent of the variance in the data and is used as the financial liberalization index (FLI). Higher values of the FLI indicate more liberalized financial regime. The FLI is a continuous measure that better reflects the nature of financial liberalization process that usually takes place gradually and may involve standstills or even reversals. It can also capture the intensity of financial reforms that a one-time binary indicator such as that in Laeven (2003) cannot. Chan, Dang, and Yan (2010) provide a more detailed description of how the FLI is constructed.

The capital control index, proposed by Edison and Warnock (2003), represents the portion of the domestic equity not available to foreign investors. We adopt this method because it produces another continuous measure of financial liberalization from a different perspective and in a

³ See <http://finance.sina.com.cn>.

⁴ The CSMAR database includes biographical information of the CEO/Chairman only from 2004, and the data coverage for more recent years is relatively better. Therefore, we select the year 2007 to compile the indicator of firm's political connection.

⁵ The paper can be downloaded from our website. The construction method of the FLI index is also available upon request.

different segment of the financial system. The CCI captures the intensity of capital controls in the equity market; lower values of the CCI indicate less restriction. It is shown in Edison and Warnock (2003) that the CCI corresponds well with the liberalization dates in many emerging markets studied in Bekaert and Harvey (2000); the CCI is also comparable to the restriction-based measure in Quinn (1997). Figures 1 and 2 depict the FLI and CCI for 1993-2007. The correlation between the two series is -0.91.

3. RESULTS

a. The Baseline Model

The main empirical results are shown in Table 4. They are obtained by dynamic GMM panel estimation method in Arellano and Bond (1991). To control for unobserved individual effects and possible endogeneity due to the presence of the lagged dependent variable, Equations (1)-(4) are estimated in the first difference and a maximum of 2 lags of the explanatory variables are used as instruments. For each regression, we report the Wald statistic for testing the joint-significance of the explanatory variables and z-statistic for testing the null hypothesis of no second-order serial correlation in the residuals. The reported regression results are obtained by two-step estimation with robust standard errors.

The estimated baseline model, Equation (1), is shown in Column (1) of Table 4. The dependent variable is the investment-capital ratio. The coefficients on lagged investment (0.188) and sales (0.083) are positive, as expected, and significant at 1 percent level. Absent of financing constraints, firms' investment is not expected to be positively associated with internal funds, here captured by the variable "Cash". The estimated coefficient on cash, 0.076, is significant at 1 percent, suggesting these exchange-listed Chinese firms, on average, experience credit constraints.

To examine the effect of CEO/Chairman's political background on the firm's investment behavior, cash is interacted with political connection indicators, as shown in Column (2). Firms with CEO/Chairman who has powerful political background do not seem to display any financing constraints; the coefficient on cash for these firms is 0.025 and statistically insignificant. In contrast, the investment of the firms without politically-connected CEO/Chairman is sensitive to internal funds; the cash coefficient for these firms is considerably larger, 0.086, and significant at 1 percent. Firms with well-connected top management, due to either preferential treatment or perceived implicit government guarantee, may have better access to external credits. Non-connected firms are exposed to greater financial frictions arising from capital market imperfections. Hence, it is important to understand how financial reforms have affected these two groups of firms.

The financial liberalization index (FLI) is interacted with individual firm's cash holdings and political connection indicator. In Column (3), the coefficients on the interactive terms indicate that while non-connected firms experience significant financing constraints (0.192), financial

reforms seem to have reduced the constraints by a large margin (-0.074). This reduction in the constraints is significant at 1 percent. On the other hand, the interactive term of cash and FLI for connected firms is positive (0.049), suggesting these firms might have been exposed to greater credit constraints, probably via stricter market disciplines, as the financial system becomes more liberalized. However, this term is not statistically significant. The regression with capital control index (CCI) in Column (4) confirms the results from the FLI regression. The sensitivity of investment to internal funds is positively associated with the degree of capital control (0.276) for non-connected firms; the coefficient is -0.152 for connected firms. These coefficients suggest that lower capital control mitigates credit constraints for the former while exacerbates them for the latter.

Our results suggest that financial liberalization has helped lowering financing constraints for firms without politically-connected CEO/Chairman. These firms, relative to their politically-connected counterparts, are normally subjected to greater asymmetric information problems and transaction costs.⁶ Such policy reforms as removal of interest rate ceiling, reduction in entry barriers into the banking sector (including bank privatization), scaling down of directed credit, and opening up capital markets to foreign investors may have promoted greater supply of funds in the economy and in turn enhanced access to external credits for these firms. The overall effects of these reform measures are found significant in this paper. On the other hand, financial liberalization, by gradually eliminating preferential treatment for some firms, can, in principles, subject these firms to greater market disciplines and therefore raise their financial constraints. There is some evidence to this effect, albeit statistically insignificant, in our paper.

The empirical evidence obtained in this paper is consistent with that in some recent studies on other emerging markets. For example, the results in Gelos and Werner (2004) indicate that financial liberalization reduces financial constraints for small firms, but not large ones, in Mexico. They argue that large firms might have had political connection and therefore preferential treatment in terms of access to external credit before financial deregulation. For Korea, Koo and Maeng (2005) find that financial liberalization improves access to external funds for financially-constrained firms, small and non-chaebol firms in their paper; there is no such gain for large and chaebol firms. Johnston and Mitton (2003) show that the capital controls imposed in Malaysia in September 1998 conferred significant gain in terms of stock market valuation for Malaysian firms with political tie to the Prime Minister.

b. Sensitivity Analysis

Instead of using a maximum of 2 lags of each explanatory as instruments, we use a maximum of 3 lags and report the results in Columns (1) and (2) in Table 5. They are similar to the results in Table 4.

⁶ Empirical studies, including those in Table 1, confirm that in other emerging markets, firms considered to operate at a informational disadvantage and therefore greater financial frictions, such as young or small or non-affiliated firms, exhibit significant credit constraints. In our sample, these firms are those without political ties. The main interest is to understand how financial reforms have affected them.

We also try an alternative definition of political connection. Here, a firm is considered to be politically-connected if the CEO or Chairman has served in the military service or achieved a political ranking at the provincial- or ministerial-level. That is, whether the CEO/Chairman was or is a government official is not taken into account. Given stricter criteria, we obtain a smaller subset of politically-connected firms. The results in Columns (3) and (4) of Table 5 reflect this change in definition and provide further support to our conclusion made above. The coefficients on cash remain insignificant for connected firms and significant for non-connected firms. Since some firms considered as politically connected in Table 4 are now classified as non-connected in Table 5, the sensitivity of firms' capital investment with regards to internal funds in this latter group is now smaller; the coefficient on cash in the FLI and CCI regression is, respectively, 0.149 and 0.120 with the new grouping versus 0.192 and 0.276 with the previous grouping. In addition, greater financial liberalization and lower restriction in equity market do not seem to confer as much benefit to this newly-defined group of non-connected firms; the reduction in the investment constraints is 0.049 and 0.176, respectively, in the FLI and CCI regression. The comparable figures in the former definition are 0.074 and 0.152. These changes suggest that the effect of political connection on the firm's investment constraints estimated in Table 4 is robust.

Next, to account for some possible bias resulting from omitting relevant variables, we add some control variables to the regression equations (3) and (4). In Columns (5) and (6), we include debt-to-capital ratio to account for the effect of firm's leverage; higher leverage is likely to raise the cost of external financing and therefore has negative impact on the firm's investment. The key results in Table 3 are retained here. The interaction terms between cash, political connection dummy, and FLI or CCI are of similar magnitude and statistical significance. The leverage term does have the expected sign but it is not statistically significant. Lastly, firms may hold cash not to guard against liquidity shortage, but in anticipation of expected future profits. The coefficient on cash then may fail to reflect investment constraints. We include sales growth over capital stock, an "accelerator" term, to account for future profits. This additional control variable is positive, as expected, and significant at 5 percent level. The results for the rest of the explanatory variables are similar to those in the baseline model.

4. CONCLUSION

Our paper, using data on Chinese listed-firms, examines a specific channel through which financial liberalization can affect economic growth: the impact on firm's financial constraints. We have shown that while overall firms in our sample experience significant credit constraints, those with politically-connected CEO/Chairman are free from such constraints. Financial reforms in China, including gradually opening up the domestic stock market to foreign investors, seem to have reduced some imperfections of the capital markets, measured in terms of reduction in credit constraints in this paper, for firms without politically-connected senior management. These firms, relative to their connected counterparts, are normally exposed to greater informational asymmetries and therefore more costly external financing. They stand to gain from

more transparent financial system, greater prudential regulations, lower entry barriers to the banking sector, and more liberalized interest rates. These reforms have been hypothesized in the literature to increase the supply of savings in the economy and therefore enhance the firm's access to external funds (McKinnon, 1973; Shaw, 1973, Obstfeld, 1994). Greater openness of stock market to foreign investors in other countries has also been shown to promote investment, profitability, and operating performance at the firm level (Bekaert and Harvey, 2000; Mitton, 2006).

Relative to other East Asian economies, China is a late comer in terms of liberalizing its domestic financial markets and capital accounts. However, China has recently been willing to participate more in both regional and global financial markets and to become a key player in the global currency system. Examples include China's participation in the Chiang Mai Initiative (in 2000), the Qualified Foreign Institutional Investors' Scheme (2002), the gradual revaluation of the Chinese yuan (since 2005), and yuan-denominated offshore bond issues (since 2009) and offshore deposit accounts (as of January 2011). Increasing regional trade and persistent high economic growth in China have drawn more capital into the country. As a result, greater East Asian financial and economic integration is expected to enhance the supply of funds available for Chinese firms' investment. Moreover, a more liberalized domestic financial system should provide more opportunities for firms to raise external funds and hence continue to lower their financial constraints.

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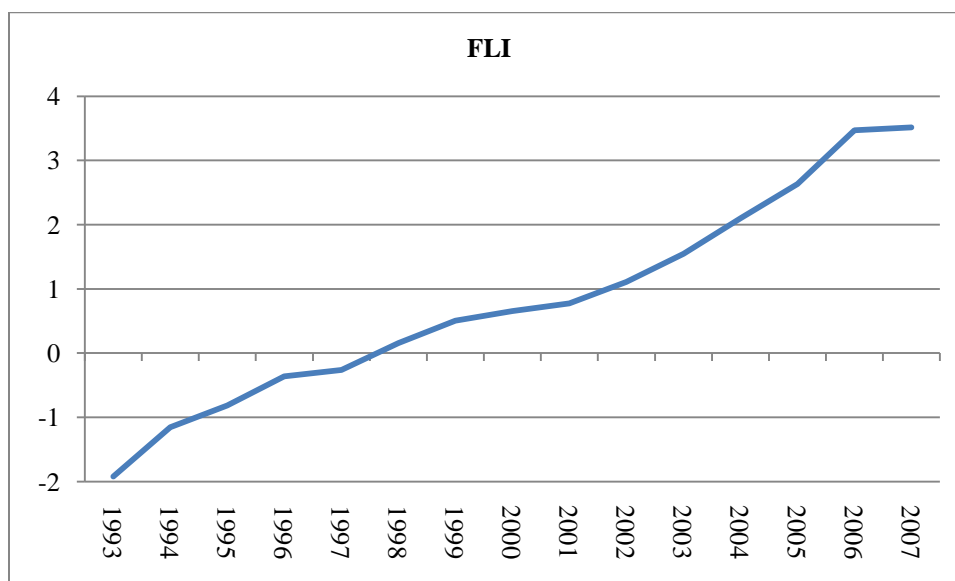


FIGURE 1

Financial Liberalization Index (FLI) captures cumulative financial reforms in interest rates, entry barriers into the banking system, prudential regulations, directed credit, and bank privatization. Larger values indicate more liberalized regime.

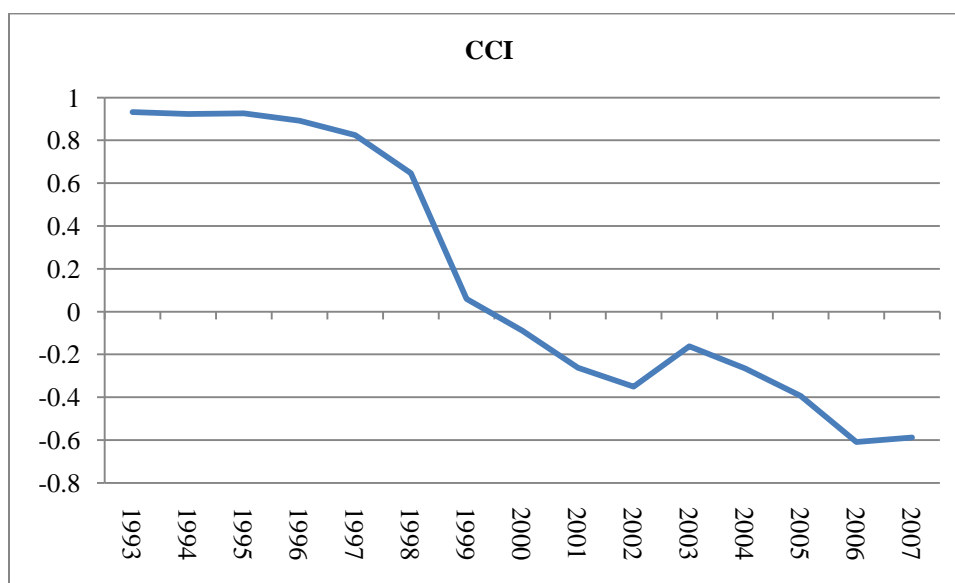


FIGURE 2

Capital Control Index (CCI) measures the degree of capital control in the Chinese equity market; it is equal to one minus the portion of the stock market available to foreign investors. Smaller values indicate less restriction.

TABLE 1
Summary of Some Recent Studies

Study	Data	Financial liberalization	Model and estimation method	Key results
Jaramillo et al. (1996)	Panel data of 420 Ecuadorian firms, 1983-1988	Single binary dummy; switch date: 1986	Euler-based investment model; GMM-difference estimator	No reduction in constraints for small firms
Hermes & Lensink (1998)	Panel of 70 Chilean firms, 1983-1992	Single binary dummy; switch date: 1987	Ad hoc investment model; fixed-effect estimator	No reduction in constraints for small firms
Forbes (2007)	Panel of 114 Chilean firms, 1988-2001	Capital control imposed during 1991-98	Euler-based investment model; GMM-difference estimator	Small firms experience higher constraints during capital controls, but not before and after
Love (2003)	Panel of 5000 firms in 36 countries, 1988-1998	Continuous measure of financial development	Euler-based investment model; GMM-difference estimator	Lower constraints for all firms, but more so for small firms
Laeven (2003)	Panel of firms in 13 developing countries, 1988-1998	Average of binary indicators for 6 aspects of financial reforms, FLI	Euler-based investment model; GMM-difference estimator	Lower constraints for small firms, higher for large firms
Koo et al. (2005)	Panel of 371 listed Korean firms	Continuous FLI is an average of 7 indicators of financial reforms	Euler-based investment model; GMM-difference estimator	Small and non-chaebol firms benefit from financial liberalization in terms of reduction in the financing constraints

TABLE 2
Definition of Regression Variables

Variable	Description
$Assets_t$	Total assets at the beginning of period t , adjusted for inflation.
I_t	Investment during t , measured by the value of capital expenditure, scaled by K_t .
K_t	Capital stock at beginning of t , measured as the value of property, plant, and equipment at the end of t less investment during t , plus depreciation and amortization expenses during t .
$Cash_t$	Cash and equivalent at the beginning of period t , scaled by K_t .
$Sales_t$	Net sales, scaled by K_t .
Political Connection	A firm is considered politically connected if its CEO or Chairman is or was a government official or military officer or someone with a provincial- or ministerial-level political rank.
$Debt_t$	Book value of long- and short-term debt at the beginning of period t .
Leverage $_t$	Ratio of $Debt_t$ to $Assets_t$.
Accelerator $_t$	$(Sales_t - Sales_{t-1})/K_t$

TABLE 3
Average Value for Key Variables Scaled by Capital Stock (2005-2007)

Variable	# of firms	Investment	Cash	Sales
All firms	1347	0.229(0.303)	0.767(1.154)	2.510(2.127)
Connected firms	330	0.195(0.272)	0.693(1.241)	1.986(1.914)
Non-connected firms	1017	0.240(0.312)	0.792(1.124)	2.681(2.165)

Note: In each cell, the first number is the average value expressed as a portion of capital and the number in the parenthesis is the standard deviation.

TABLE 4
Main Results of the Investment Model

	(1) Baseline	(2) Political connection	(3) FLI	(4) CCI
Investment _{t-1}	0.188** (0.035)	0.184** (0.035)	0.150** (0.034)	0.152** (0.034)
Sales	0.083** (0.020)	0.080** (0.018)	0.097** (0.024)	0.091** (0.023)
Cash	0.076** (0.019)			
Cash*Pol		0.025 (0.050)	0.077 (0.067)	0.108 (0.080)
Cash*Non-pol		0.086** (0.020)	0.192** (0.038)	0.120** (0.025)
Cash*FLI*Pol			0.049 (0.101)	
Cash*FLI*Non-pol			-0.074** (0.026)	
Cash*CCI*Pol				-0.152 (0.433)
Cash*CCI*Non-pol				0.276* (0.107)
Wald test ^a	66.97**	67.31**	151.60**	96.66**
Serial corr ^b	1.54	1.51	0.40	0.57
# firms	1226	1226	1226	1226
# observations	3399	3399	3399	3399

Note: ** and * denote significance at the 1% and 5% levels respectively. Standard errors are in parentheses. The dependent variable is investment-to-capital ratio (investment for short). Sales are total sale revenue scaled by capital stock; cash is cash holdings scaled by capital stock. The results are obtained by two-step estimation with robust standard errors in Arellano and Bond (1991). We use a maximum of 2 lags for each explanatory as instruments.

^a Wald statistic is a test of the joint significance of the explanatory variables.

^b Serial correlation is the z-statistic for testing the null hypothesis of no second-order serial correlation in the residuals.

TABLE 5
Sensitivity Analysis: Using Alternative Lag Length and Definition of Political Connection and Adding Control Variable

	<u>Different lag length^a</u>		<u>Political connection 2^b</u>		<u>Leverage^d</u>		<u>Accelerator^e</u>	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	FLI	CCI	FLI	CCI	FLI	CCI	FLI	CCI
Investment _{t-1}	0.158** (0.034)	0.158** (0.034)	0.163** (0.034)	0.163** (0.034)	0.146** (0.018)	0.148** (0.034)	0.147** (0.035)	0.147** (0.035)
Sales	0.102** (0.020)	0.095** (0.019)	0.102** (0.022)	0.096** (0.021)	0.090** (0.025)	0.087** (0.023)	0.050 (0.034)	0.047 (0.030)
Cash*Pol	0.088 (0.049)	0.054 (0.040)	0.138 (0.251)	-0.086 (0.511)	0.056 (0.073)	0.153 (0.119)	0.091 (0.077)	0.164 (0.116)
Cash*Non-pol	0.179** (0.035)	0.122** (0.026)	0.149** (0.032)	0.102** (0.024)	0.214** (0.038)	0.125** (0.026)	0.197** (0.033)	0.130** (0.024)
Cash*FLI*Pol	-0.033 (0.020)		-0.103 (0.225)		0.126 (0.078)		0.086 (0.055)	
Cash*FLI*Non-pol	-0.060** (0.017)		-0.049** (0.018)		-0.092** (0.025)		-0.070** (0.015)	
Cash*CCI*Pol		0.128 (0.086)		0.687 (1.080)		-0.456 (0.336)		-0.354 (0.268)
Cash*CCI*Non-pol		0.233** (0.067)		0.176* (0.079)		0.352** (0.102)		0.279** (0.065)
Control variable ^c	-0.058 (0.048)	-0.057 (0.050)	0.031* (0.013)	0.031* (0.014)
Wald test ^a	83.42**	84.16**	83.68**	82.73**	102.56**	95.39**	80.19**	78.85**
Serial corr ^b	0.66	0.74	0.80	0.81	-0.11	0.12	0.42	0.47
# firms	1226	1226	1226	1226	1216	1216	1226	1226
# observations	3399	3399	3399	3399	3366	3366	3399	3399

Notes: See notes to Table 4.

^a We use a maximum of 3 lags for each explanatory variable as instruments here.

^b Alternative definition of political connection: only military service and political ranking at provincial-level and ministerial-level of the CEOs and Chairmen are considered. That is, whether the CEO/Chairman was or is a government official is not taken into account.

^c Coefficient on leverage (^d) and accelerator (^e) variable. The leverage variable refers the debt-to-capital ratio. The “accelerator” term is defined as sales growth over capital stock.

^d To control for the effect of firm’s leverage on investment, a ratio of total debt to assets is added to the model.

^e Sales growth over capital stock is included to model accelerator effects.

APPENDIX

Investment Model

We follow closely an investment model based on the Euler-equation approach used recently by Forbes (2007), Harrison et al (2004), Love (2003), and Laeven (2003). In this model, each firm is assumed to maximize its present value, which is equal to the sum of discounted expected dividends, subject to capital accumulation and external financing constraints. The maximization problem is:

$$V(K_t, \xi_t) = \max_{\{I_{t+s}\}_{s=0}^{\infty}} D_t + E_t \left[\sum_{s=1}^{\infty} \beta_{t+s-1} D_{t+s} \right] \quad (\text{A1})$$

subject to:

$$D_t = \Pi_t(K_t, \xi_t) - C(I_t, K_t) - I_t, \quad (\text{A2})$$

$$K_{t+1} = (1 - \delta)K_t + I_t, \text{ and} \quad (\text{A3})$$

$$D_t \geq 0, \quad (\text{A4})$$

where K_t is the capital stock at the beginning of period; ξ_t is a productivity shock; D_t is the dividend; $E_t[\cdot]$ is the expectation operator conditional on information at time t ; β is a discount factor; $\Pi(\cdot)$ is the profit function; $C(\cdot)$ is the adjustment cost function; I_t is investment over period t ; and δ is the capital depreciation rate.

Let λ_t be the multiplier for the non-negativity constraint on dividends (Equation A4), the first-order condition in the maximization problem is:

$$\left(\frac{\partial V}{\partial I} \right)_t = -(1 + \lambda_t) \left[\left(\frac{\partial C}{\partial I} \right)_t + 1 \right] + \beta_{t+1} E_t \left(\frac{\partial V}{\partial I} \right)_{t+1}. \quad (\text{A5})$$

Define marginal Q as the increase in the firm's value from one extra unit of capital:

$$Q_t = \left(\frac{\partial V}{\partial K} \right)_{t+1}. \quad (\text{A6})$$

Then the envelope condition is:

$$\left(\frac{\partial V}{\partial K} \right)_t = Q_{t-1} = -(1 + \lambda_t) \left(\frac{\partial D}{\partial K} \right)_t + (1 + \delta) \beta_{t+1} E_t Q_t. \quad (\text{A7})$$

Equations (A5) and (A7) are then combined to produce the Euler equation:

$$1 + \frac{\partial C(I_t, K_t)}{\partial I_t} = \beta_t E_t \left[\left(\frac{1 + \lambda_{t+1}}{1 + \lambda_t} \right) \left\{ \frac{\partial \Pi(K_{t+1}, \xi_{t+1})}{\partial K_{t+1}} + (1 - \delta) \left(1 + \frac{\partial C(I_{t+1}, K_{t+1})}{\partial I_{t+1}} \right) \right\} \right]. \quad (\text{A8})$$

The ratio $(1 + \lambda_{t+1} / 1 + \lambda_t)$ is the relative shadow cost of external funds in period $t+1$ versus t . In a world without financial friction, $\lambda_t = \lambda_{t+1}$. If the shadow cost of external financing is higher at t than at $t+1$, then the firm is deemed financially constrained.

Gilchrist and Himmelberg (1999) show that if production takes the form of a Cobb-Douglas function then the marginal profit of capital (MPK) can be derived as:

$$MPK_{it} = \gamma_0 i + \gamma_1, t \left(\frac{\text{Sales}}{K} \right)_{it}, \quad (\text{A9})$$

where γ_{0i} is firm's fixed effect, $\gamma_{1,t}$ is the ratio of capital's share in production to the mark-up, and Sales denote total sale revenue.

Let the relative shadow cost of external funds be a function of firm's cash stock at the beginning of period:

$$\frac{1+\lambda_{t+1}}{1+\lambda_t} = \mu_0 + \mu_1 \left(\frac{Cash}{K} \right)_{it}. \quad (A10)$$

The following adjustment cost function is assumed:

$$C(I_t, K_t) = \frac{\theta_1}{2} \left[\left(\frac{I}{K} \right)_t - \theta_2 \left(\frac{I}{K} \right)_{t-1} - \theta_i + \theta_t \right]^2 K_t, \quad (A11)$$

where θ_1 and θ_2 are constant, θ_i firm i 's fixed effect, and θ_t time effect. This implies the marginal adjustment cost of investment:

$$\left(\frac{\partial C}{\partial I} \right)_t = \theta_1 \left[\left(\frac{I}{K} \right)_t - \theta_2 \left(\frac{I}{K} \right)_{t-1} - \theta_i + \theta_t \right]. \quad (A12)$$

Note that in this function the adjustment cost is linearly homogeneous in capital and investment. The functional form also allows for persistence in adjustment costs.

A first-order Taylor approximation around the means is used to linearize the Euler equation (A8) and by letting $E(1+\lambda_{t+1}/1+\lambda_t)=1$, we obtain a baseline investment equation that will be used to investigate financing constraints:

$$\left(\frac{I}{K} \right)_{it} = \alpha_0 + \alpha_1 \left(\frac{I}{K} \right)_{i,t-1} + \alpha_2 \left(\frac{Sales}{K} \right)_{it} + \alpha_3 \left(\frac{Cash}{K} \right)_{it} + f_i + \varepsilon_{it}, \quad (A13)$$

where f_i is the firm-specific effect and ε_{it} is the white-noise error term. This is Equation (1) in the main text.